Heterogeneity considerations in monetary policy design: the case of Peru[1]

Central Reserve Bank of Peru

1. Introduction

There has been a recent surge in research on the implications of household and firm heterogeneity in monetary policy. The Central Reserve Bank of Peru (BCRP) is well-acquainted with this trend, as heterogeneity is a defining feature of Peru's economy. The BCRP's mandate focuses on preserving monetary stability, a goal that necessitates a deep and granular understanding of the economy. For this reason, the BCRP has also been considering aspects of heterogeneity for some time, recognising their relevance to Peru's economy, which is characterised by a large informal sector and financial dollarisation.

This article examines how the BCRP incorporates heterogeneity considerations into monetary policy analysis. It also outlines various indicators developed to measure heterogeneity, explores how aggregate outcomes affect different population segments, and considers - at least theoretically - whether wealth heterogeneity influences key aggregates relevant to monetary policy.

The monetary policy assessment process consists of two key stages: (i) performing data analysis of relevant indicators; and (ii) using forecasting models conditioned on different policy stances. The first stage primarily focuses on aggregate data but is complemented by indicators capturing heterogeneity among agents. In Peru, the interest rate, exchange rate and expectations channels are the most relevant for monetary policy transmission. These channels are incorporated into the BCRP's Quarterly Projection Model (Aguirre et al (2019)). While the model's aggregate framework does not explicitly capture heterogeneity, it is accounted for through the calibration process and the construction for certain variables. The influence of heterogeneity on monetary policy transmission is discussed in Section 2.

Inflation is often described in the literature as a tax that disproportionately affects lower-income groups. High inflation rates explicitly affect income distribution among households, underscoring the critical role of monetary policy in ensuring price stability. An exercise measuring how inflation is perceived across income levels—and its implications for poverty—is presented in Section 3.

Given that informality is a significant source of heterogeneity among workers, a preliminary analysis of the informal labour market's influence on real interest rates is presented in Section 4. A relevant paper on informality in the Peruvian economy by Castillo and Montoro (2010) is also discussed in a box within this section.

[1] Authors: Adrián Armas, Carlos Montoro, Alan Ledesma, Leonardo Alvaro, and Luis Castillo (BCRP).

Drawing on Peru's experience with past economic instability, the BCRP has long recognised the importance of heterogeneity in the economy. Its strategy has focused on maintaining low inflation, which especially benefits more vulnerable households. Moreover, several unconventional BCRP policies—such as liquidity operations during the pandemic and de-dollarisation programmes—have indirect distributional effects, even though they were not designed for this purpose. These policies are outlined in Section 5.

2. Heterogeneity in monetary policy design

2.1 Monetary policy transmission

Monetary policy has differentiated distributional effects across firms and households, as it operates through distinct monetary transmission channels. Corporate entities typically experience a faster pass-through of interest rate changes, whereas smaller or riskier firms face slower and less pronounced effects. This aligns with Ottonello and Winberry (2020), who show that the effects of monetary policy shocks on investment depend on firms' financial frictions. Contrary to the standard financial accelerator mechanism—which suggests that more constrained firms would significantly expand investment during monetary easing—it is instead less risky firms that tend to drive investment growth. Higher-risk firms face a steeper marginal cost of investment, limiting their responsiveness to policy changes.

Significant heterogeneity also exists in the transmission of monetary policy across households. Those with greater access to financial products tend to respond more directly and rapidly to policy changes, while households with limited financial inclusion experience these effects more indirectly, often through general equilibrium adjustments. The literature highlights the importance of household wealth heterogeneity in shaping household responses. Kaplan et al. (2018) argue that transmission depends on households' positions within the wealth distribution. In their framework, the classical substitution effects of interest rate changes on consumption are relatively small, while a high share of hand-to-mouth households amplifies the income channel. Hong (2022) finds that marginal propensities to consume are significantly higher among Peruvian households than in the United States, suggesting a potentially stronger role for this channel in Peru.

2.2 Data on heterogeneity

Monitoring economic data is a critical component of monetary policy analysis. It complements forecasting models by providing insights into aspects of the economy that models may not fully capture. In the case of Peru, several dimensions of agent heterogeneity are relevant, and monetary policy assessment relies on a range of datasets covering households and firms.

The National Household Survey (*Encuesta Nacional de Hogares*, ENAHO), an annual survey with quarterly updates, is the primary source of household-level data. It features a quasi-panel structure, tracking a subset of households annually. ENAHO provides information on a wide range of characteristics, including financial inclusion,

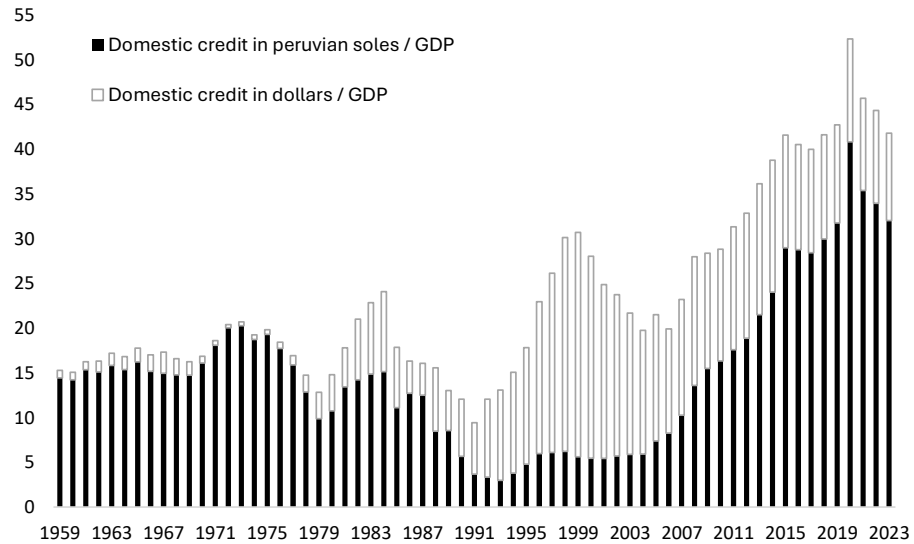
financial literacy, expenditure, income, indebtedness, homeownership, and employment. Since 2021, the National Labour Survey (*Encuesta Permanente de Empleo Nacional,* EPEN) has offered monthly labour market data. Additionally, formal firms report employment data to the Superintendency of Customs and Tax Administration (*Superintendencia Nacional de Aduanas y de Administración Tributaria*, SUNAT). Together, these sources enable the estimation of informal employment indicators. The implications of informality for Peruvian business cycles are explored in Section 4.

Firm-level activity data—covering revenue, costs, employment—are sourced from the Annual Economic Survey (*Encuesta Económica Anual*, EEA) and the Economic Census (Censo Económico). The latter captures the universe of firms in the country but is conducted only intermittently, with the most recent editions in 2022 and 2008. While both sources offer annual data, they are available with a one-year lag and are therefore unsuitable for high-frequency policy analysis. However, they remain valuable for understanding longer-term structural trends. In addition, the BCRP closely monitors customs data on international trade flows, reflecting the economy's reliance on mineral exports and its increasing diversification into non-commodity exports.

2.3 Heterogeneity and financial dollarisation

Heterogeneity in financial dollarisation at the firm level is a defining feature of Peru's economy. Armas (2016) provides a detailed account of its dimensions and evolution, tracing its roots to the inflationary and hyperinflationary episodes between the 1970s and early 1990s. These events severely eroded the value of the local currency, prompting people to store their wealth in dollars. Unlike other countries, Peru lacked financial options, such as inflation-indexed savings instruments, to preserve the value of savings, which exacerbated dollarisation (Graph 1).

Financial intermediation (credit as % of GDP) Graph 1



Information for depository institutions supplemented by banking system data until 1991.

Over the past 20 years, dollarisation has declined due to shifting preferences and de-dollarisation programmes implemented by the BCRP. Since Explicit Inflation Targeting (EIT), the sol became more profitable and savings in dollars lose value. In the period between 1999 to 2010, dollarisation of credit reduced from 81.7% to 45.6%. Following this period and with the end of the commodity boom and the following depreciation of the sol, the de-dollarisation programmes led by the BCRP managed to help reduce dollarisation of credit between 40.4% in 2013 to 29% in 2016.

Financial dollarisation affects firms unevenly. Although dollarisation remains prevalent among larger firms, its decline has been more pronounced in credit to smaller firms and households (personal loans), benefiting them given their lower capacity to hedge against currency mismatches (Table 1). The BCRP's FX interventions also aim to mitigate this risk.

Dollarisation of credit by depository institutions to the private sector (% of credit) Table 1

	Jan 2011	Dec 2013	Dec 2016	Dec 2024
Corporate and large firms	69.0	65.2	48.9	52.5
Medium firms	67.1	62.3	42.9	36.5
Small and micro-firms	18.9	12.3	7.0	5.6
Credit to businesses	55.5	50.8	38.1	34.0
Credit to individuals	26.0	22.0	13.3	6.5
Total	45.6	40.4	29.0	22.8
Broad financing 1/				
Corporate and large firms	81.4	82.1	76.0	73.3
Credit to businesses	66.6	66.1	61.3	53.9
Total	55.4	53.8	48.6	38.5

1/ Broad financing encompasses funding from depository institutions, local capital markets, and foreign sources.

Source: BCRP.

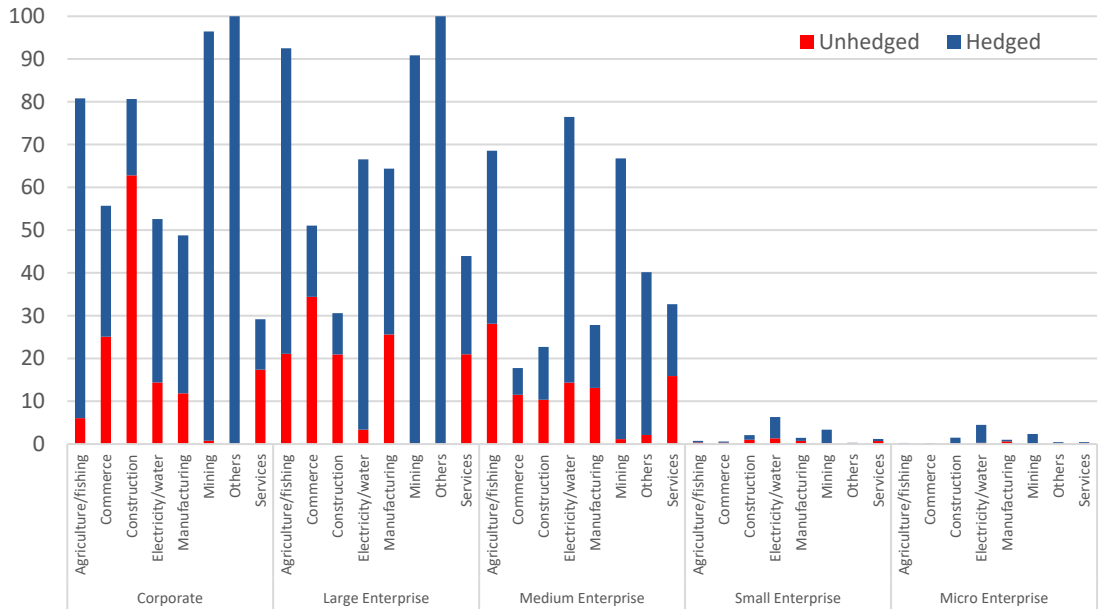
In Peru's highly dollarised economy, currency mismatches between firms' assets and liabilities increase the risk of default during periods of significant exchange rate volatility. The Consolidated Credit Report (*Reporte Consolidado de Crédito*, RCC) provides administrative data from financial institutions on individual firm and consumer debt. Updated monthly with minimal delay, it serves as a reliable indicator of indebtedness in the economy.

A more granular analysis of firms' exposure to exchange rate risk is made possible by a complementary dataset from the Superintendency of Banking, Insurance, and Private Pension Fund Administrators (SBS). This dataset, known as the Credit Report on Debtors (*Reporte Crediticio de Deudores*, RCD), includes a variable that captures the exchange rate exposure of each debtor as assessed by the lending bank. When combined with information on the economic sectors to which firms belong, this allows for an assessment of unhedged dollarization at the sectoral level.

The analysis (Graph 2) reveals that while dollarization is more prevalent among larger firms, these firms are generally better hedged against exchange rate risk. Their risk mitigation strategies include generating revenue in U.S. dollars and employing financial derivatives. For instance, in the mining sector, large and corporate firms

show dollarization ratios exceeding 90%. However, this exposure is almost entirely hedged—either through dollar-denominated income or the use of currency derivatives.

Unhedged dollarisation rate by borrower industry and type in 2023 (percent) Graph 2

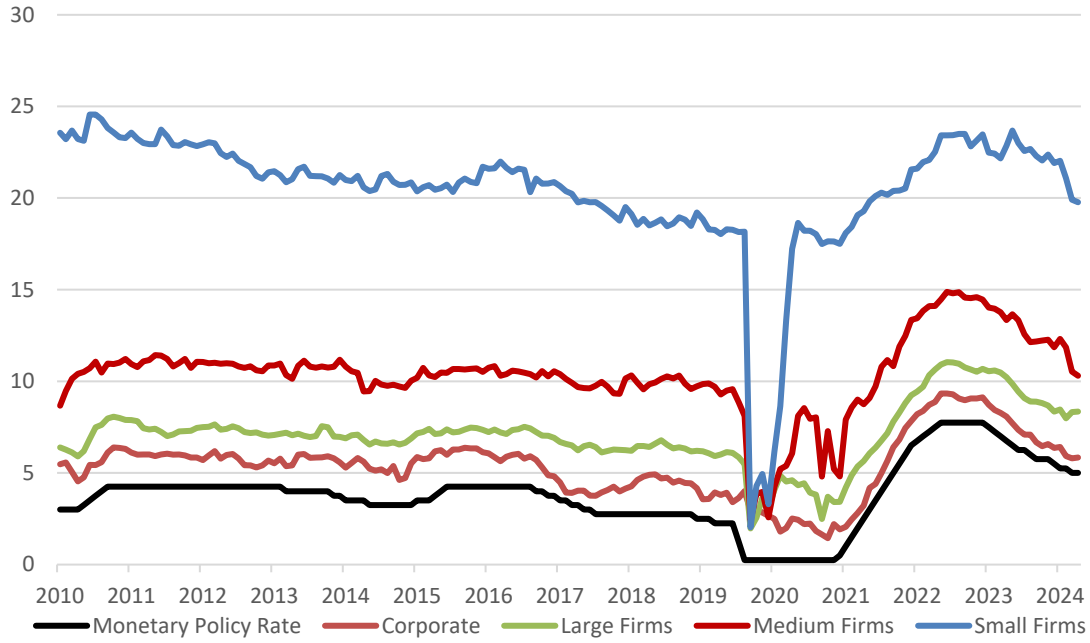


Source: SBS.

2.4 Heterogeneity and credit markets

Another valuable dataset from the SBS includes information on the cost of credit, with interest rates disaggregated by firm size. As shown in Graph 3, interest rates tend to be lower for larger firms, which is consistent with empirical evidence that such firms pose lower credit risk. Moreover, the transmission of monetary policy to market interest rates appears to be effective. During the COVID-19 pandemic, the *Reactiva Perú* program (discussed in Section 5) had a clear impact on lending rates by reducing the credit risk, bringing them closer to money market and yield curve rates across all firm size categories.

Average interest rate by firm size (percent) Graph 3



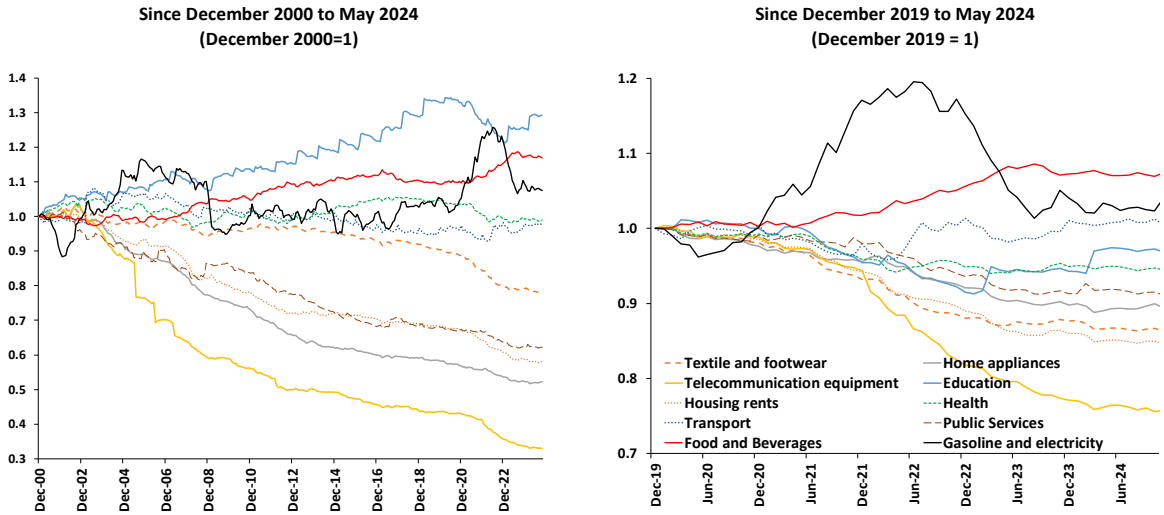
Source: SBS.

2.5 Heterogeneity and relative prices

Crucially, the BCRP monitors relative prices and inflation expectations to better understand additional dimensions of economic heterogeneity. During the recent global inflationary episode, data on inflation heterogeneity revealed significant changes in relative prices. International supply disruptions, including those for oil and fertilisers, combined with climate events, led to persistent increases in the relative prices of food and energy. This complicated inflation control, as inflation and output moved in opposite directions.

Prices relative to the consumer price index

Graph 4



Source: SBS.

When supply shocks are expected to be temporary, it may be optimal for a central bank to refrain from responding, given the lag in monetary policy effects. However, the BCRP observed that supply shocks affecting relative prices spilled over into inflation expectations. This prompted the BCRP to shift from an expansionary stance during the pandemic to a contractionary one to regain control over inflation.

Since the BCRP adopted explicit inflation targets, there have been five inflationary episodes, defined as periods when inflation expectations exceeded the upper limit of the target range. These episodes occurred during times of elevated inflation, which began to influence inflation expectations. BCRP (2024) reviews these inflationary episodes and examines the statistical relationship between inflation and inflation expectations. The analysis finds that inflation Granger-causes inflation expectations, with the food and energy component of inflation playing a key role, suggesting an important spillover effect of supply shocks on expectations.

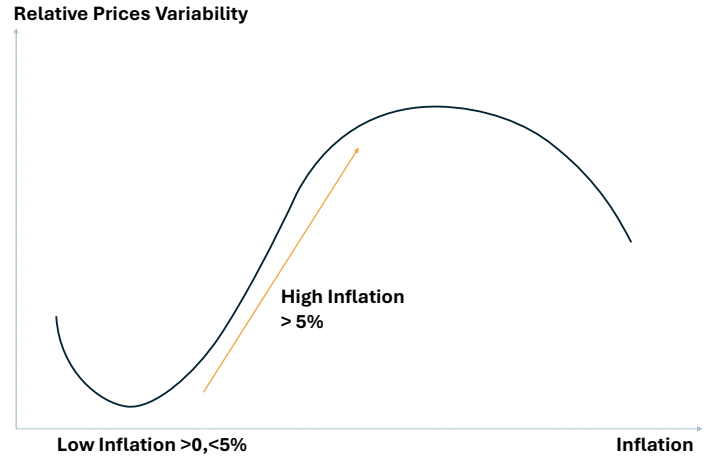
The BCRP remains committed to controlling inflation at the aggregate level, thereby mitigating the risk of severe distributional consequences that could result from economic instability associated with unanchored inflation. Failure to respond to inflationary pressures in a timely manner could undermine the BCRP's credibility, substantially increasing the welfare costs of restoring stability in the future.

By controlling inflation, monetary policy also affects price dispersion, as these two indicators are positively related during periods of high inflation and exhibit a U-shaped relationship when inflation is low (Ascari et al (2018)) as shown in Graph 5. Price dispersion, which reflects changes in relative prices, directly affects welfare. While some price dispersion is efficient, reflecting relative scarcities, dispersion caused by price rigidities is inefficient, as some firms are unable to adjust their prices. Therefore, controlling inflation reduces this price volatility, enhancing overall

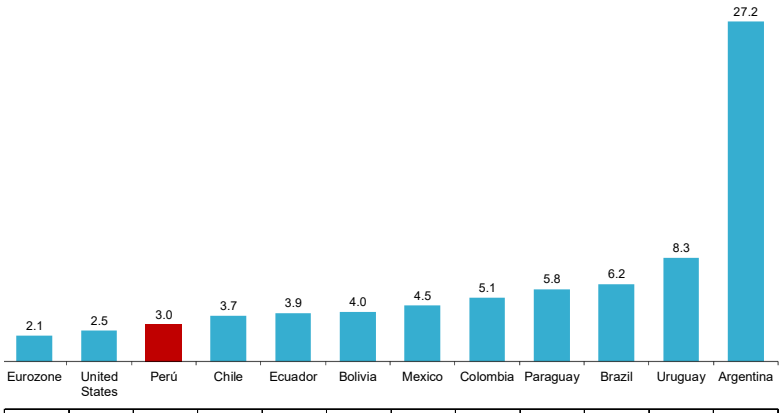
Graph 6: Average annual inflation and standard deviation (2001-23)

economic welfare. Peru's average annual inflation and inflation variability have been among the lowest in Latin America this century (Graph 6).

Relative price variability and inflation — Graph 5



Average annual inflation and standard deviation (2001-23) — Graph 6



Source: WEO (October 2024) and BCRP

3. Heterogeneous household perception of inflation

The consumer price index (CPI) reflects the average consumption basket of the population. However, consumption patterns differ across wealth levels and geographic areas, leading to variations in perceived inflation, which distinguishes individual inflation experiences from headline inflation (calculated using the CPI).

To estimate perceived inflation for different population groups in Peru, we first determine the average structure of each group's consumption basket using ENAHO

data on income, expenditures and other demographic and socioeconomic characteristics at both the household and individual levels. Total household expenditure is categorised into nine groups: (1) food and non-alcoholic beverages at home; (2) food and non-alcoholic beverages away from home; (3) clothing and footwear; (4) housing rent, fuel, electricity and household maintenance; (5) furniture, appliances and housing upkeep; (6) healthcare and medical services; (7) transport and communications; (8) recreation, entertainment, cultural services and education; and (9) other goods and services. For each group, a price index is constructed as a weighted sum of the individual price indices for each expenditure category, with weights reflecting the consumption basket's composition each year.

The composition of consumption baskets varies significantly across expenditure levels and between urban and rural areas. Consistent with a common pattern, the share of expenditure on food and non-alcoholic beverages is much higher among the poorest households. In 2023, this category accounted for 54.8% of total expenditure for the lowest quintile, down from 57.9% in 2019. In contrast, for the highest quintile, food and beverages made up 32.1% of total expenditure in 2023.

Average structure of total expenditure by per capita expenditure quintile (%) Table 2

Quintile of per capita expenditure	2019					2023				
	I	II	III	IV	V	I	II	III	IV	V
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Food and non-alcoholic beverages	57.9	52.7	48.1	43.3	31.9	54.8	52.7	48.3	43.3	32.1
At home	*45.6*	*38.8*	*33.5*	*28.5*	*19.5*	*44.9*	*41.4*	*35.9*	*30.6*	*20.8*
Away from home	*12.3*	*14.0*	*14.6*	*14.9*	*12.5*	*9.9*	*11.3*	*12.3*	*12.7*	*11.3*
Clothing and footwear	4.5	4.1	3.9	3.8	3.8	3.5	3.4	3.3	3.3	3.1
Housing rent, fuel, electricity and household maintenance	12.9	15.4	16.9	18.6	22.1	17.0	17.2	18.5	19.5	24.7
Furniture, appliances and housing upkeep	3.7	3.3	3.5	3.4	4.7	4.4	3.9	3.8	3.7	4.4
Healthcare and medical services,	5.6	6.1	6.9	7.5	9.3	4.9	5.7	7.1	8.7	10.5
Transport and communications	6.8	8.9	10.4	11.7	13.6	7.9	9.1	10.0	11.4	12.8
Recreation, entertainment, cultural services and education	5.2	5.8	6.4	7.4	9.9	4.6	4.8	5.5	6.3	8.1
Other goods and services	3.5	3.7	4.1	4.2	4.7	3.0	3.2	3.5	3.8	4.3

Source : Authors' calculations based on data from INEI – ENAHO.

Geographical differences also influence expenditure patterns. Rural households, which typically fall into lower expenditure quintiles, allocate a larger share of their spending to food and non-alcoholic beverages than urban households.

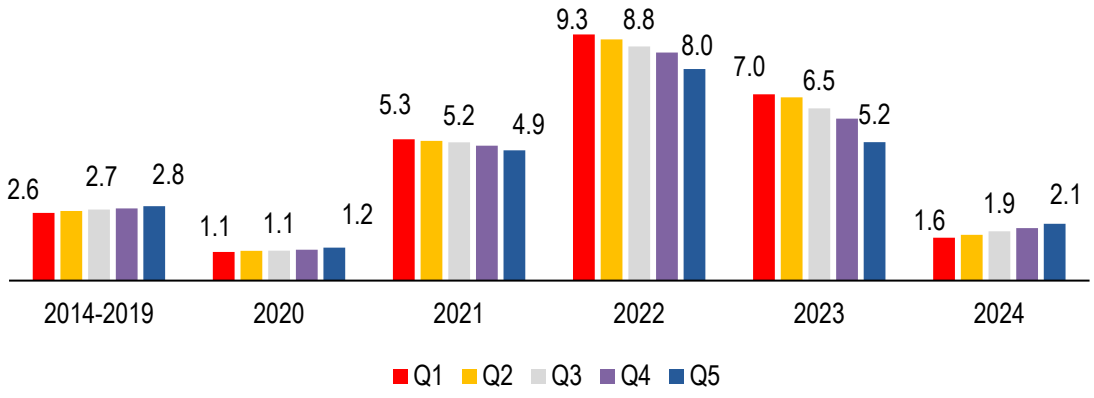
Average structure of total expenditure by geographical area (%) Table 3

	2019		2023	
	Urban	Rural	Urban	Rural
Total	**100**	**100**	**100**	**100**
Food and non-alcoholic beverages	39.4	57.2	39.2	56.6
At home	*25.9*	*43.4*	*27.7*	*43.3*
Away from home	*13.5*	*13.8*	*11.4*	*13.3*
Clothing and footwear	3.7	5.0	3.1	4.5
Housing rent, fuel, electricity and household maintenance	20.3	9.6	22.7	9.7
Furniture, appliances and housing upkeep	3.9	4.4	3.9	5.2
Healthcare and medical services,	7.9	7.4	8.7	7.8
Transport and communications	12.0	8.2	11.6	8.8
Recreation, entertainment, cultural services and education	8.4	4.6	7.0	4.0
Other goods and services	4.4	3.7	3.9	3.4

Source : Authors' calculations based on data from INEI – ENAHO.

As a result, periods of high food inflation disproportionately erode the purchasing power of low-income households. This is evident when comparing perceived inflation across groups. Between 2015 and 2019, average year-on-year inflation was relatively consistent across expenditure quintiles, a pattern that continued through 2020. However, between 2021 and 2023, perceived inflation was significantly higher for the lowest quintile. Between December 2020 and December 2023, the CPI increased by 12.0%, while the food and non-alcoholic beverages price index rose by 18.0%. This trend has moderated recently, with the CPI rising by 1.8% and food prices by 1.5% between December 2023 and October 2024, reflecting the normalisation of food inflation following global and domestic shocks, including the Russia-Ukraine war and El Niño–Southern Oscillation (ENSO) events.

Perceived inflation by per capita expenditure quintile (%) Graph 7

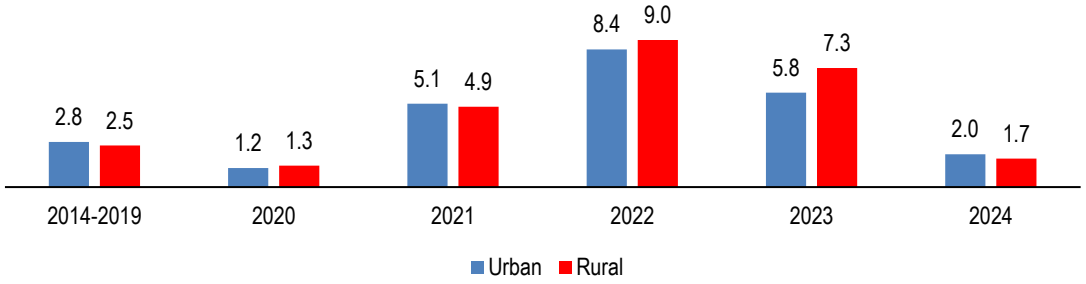


* The 2014-19 values represent average perceived inflation over this period.

Source: Authors' calculations based on data from INEI.

Similar patterns emerge when comparing urban and rural households. Prior to the food price shocks, inflation rates were broadly comparable. However, as food prices surged, rural households experienced higher perceived inflation.

Perceived inflation by geographical area (%) Graph 8



* The 2014-19 values represent average perceived inflation over this period.

Source: Authors' calculations based on data from INEI.

These heterogeneous effects have implications for monetary policy:

- Distributional effects: food inflation disproportionately affects poorer households, exacerbating inequality during prolonged periods of food price shocks. While monetary policy has limited influence on food prices, acknowledging these disparities can improve how the policy is communicated to the public.
- Impact on inflation expectations: differences in perceived inflation can shape inflation expectations. Groups perceiving higher inflation than the CPI suggests may adjust their consumption behaviour in unexpected ways, challenging central bank forecasts and analysis.

Variations in perceived inflation provide valuable insights into broader economic conditions. For example, Peru's poverty rate rose sharply from 20.1% in 2019 to 27.6% in 2024 after the pandemic, even as real GDP per capita recovered to just 0.8% above its 2019 level. This discrepancy is partly attributed to stagnant real incomes among the poorest households, driven by weak wage growth and their higher exposure to the inflation surge.

4. A heterogeneous agent model of labour informality for determining the steady-state real interest rate

One of the defining features of the Peruvian economy is labour informality, which reflects significant heterogeneity among households and firms. While it is challenging to fully quantify the aggregate effects of this heterogeneity, it is possible to explore its theoretical implications for key variables relevant to monetary policy. Galindo et al (2024) examine how labour informality influences the equilibrium real interest rate by affecting the loanable funds market.

To illustrate this relationship, the authors consider a closed economy with an exogenous endowment and two structural states: formality and informality. Each period, market participants face an exogenous probability of transitioning between

these states or remaining in their current one.[2] Compared with formal workers, informal participants earn lower incomes, do not pay taxes and face a higher interest rate premium. In addition, there is no market for contingent assets, so individuals manage income risk by issuing or holding bonds in the financial market. Participants in the formal sector, due to their higher incomes, generally demand bonds. However, since state transitions are exogenous, both formal and informal participants may act as borrowers or lenders.

One of the earliest theoretical papers on informality and business cycle is the work by Castillo and Montoro (2010), discussed in Box 1. The analysis presented in this section is theoretical and subject to important caveats. For instance, the model excludes traditional interest rate determinants, omits unemployment as a distinct labour state, and assumes exogenous transition probabilities, disregarding potential state dependencies. These limitations underscore that the conclusions should be interpreted as theoretical hypotheses requiring empirical validation.

It is important to emphasise that, in this model, the only driver of dynamics is the exogenous probability of changing states. If there is no probability of changing states after a worker is assigned a status at the initial moment, there will be no precautionary savings, no variation in the distribution of workers, and the interest rate will solely reflect the subjective discount rate. Heterogeneity will have no role in equilibrium. Consequently, the results highlighted here should be understood as a marginal contribution to the determination of the aggregate interest rate. Depending on the calibration, their relevance may remain limited when standard macroeconomic determinants are considered.

In this set up, informality drives heterogeneity, as participants make optimal consumption and savings decisions, accounting for potential state transitions. Formal sector participants save to prepare for potential transitions to informality, while informal sector participants may borrow in anticipation of entering the formal sector. This results in wealth disparities across the two groups. Consistent with this, the model's simulations show that economies with higher informality experience more pronounced wealth inequality.

The main result concerning equilibrium in the loanable funds market shows that an increase in the size of the informal sector generates two opposing forces:

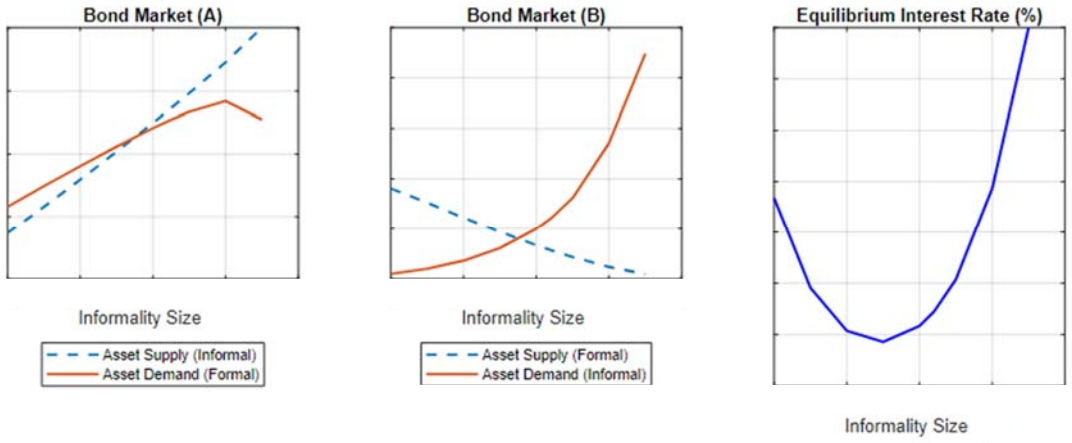
- A higher likelihood of transitioning to informality increases precautionary savings, boosting bond demand. This increases bond prices and lowers the real interest rate.
- A larger share of the population transitioning to informality increases bond supply to fund consumption, pushing bond prices down and raising the real interest rate.

Graph 9 shows that, for this specific calibration and abstracting from other macroeconomic determinants, these forces result in a U-shaped relationship between the real interest rate and informality. At low informality levels, bond supply dominates, driving bond prices higher and interest rates lower. Beyond a certain

[2] The framework in use builds on the continuous-time general equilibrium model with incomplete markets and uninsured labour risk introduced by Achdou et al (2022), which extends the seminal works by Bewley (1977), Imrohoroglu (1989), Huggett (1993), and Aiyagari (1994).

threshold, the likelihood of transitioning to informality increases to the point where formal workers raise their bond demand more than the supply added by informal workers. As a result, bond prices fall, and the interest rate rises.

Bond market equilibrium and real interest rate determination Graph 9



* The 2014-19 values represent average perceived inflation over this period.

Source: Authors' calculations based on data from INEI.

The steady-state (long-run) real interest rate represents a point of neutral monetary policy. The model suggests that a country like Peru, characterised by a large informal sector (abstracting from other factors), may have a higher neutral interest rate compared with one with a smaller informal sector. Furthermore, an increase in the size of the informal sector could elevate the neutral rate.

Although this model is highly stylised, abstracting from many factors relevant to emerging market economies like Peru, it highlights the potential effect of heterogeneity stemming from labour informality. Other determinants of the neutral rate, such as international interest rates, domestic productivity, and demographic trends, remain critical.

Box 1

"Monetary policy in the presence of informal labour markets"
(Castillo and Montoro, 2010)

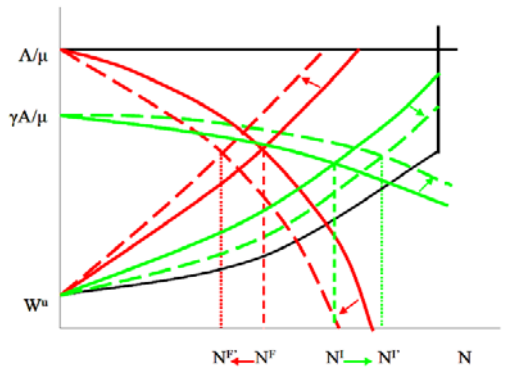
Castillo and Montoro (2010) extend a standard New Keynesian framework by incorporating a search model with two types of labour: formal and informal. This approach allows for a comparison of two counterfactual scenarios—one without informality and another where both types of labour coexist. The model examines the economy's steady state, its dynamics under AD and productivity shocks, and the monetary policy implications.

Labour market frictions are modelled following Blanchard and Gali (2010), where hiring costs depend on labour market tightness, defined as the ratio of vacancies to unemployment. Informal labour is characterised by lower productivity and reduced hiring costs compared with formal labour, consistent with the empirical evidence. The study focuses on an equilibrium where firms employ both types of labour, equalising marginal costs across sectors. Wages are determined through Nash bargaining between workers and firms, dividing the surplus generated by employment matches.

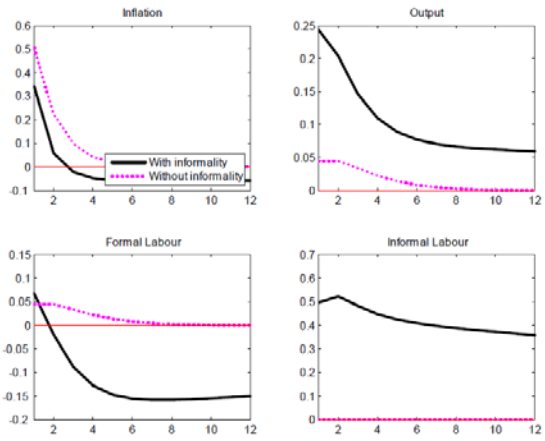
In equilibrium, the wage curve is upward sloping, starting at the reservation wage for unemployed workers (W^u) and rising with employment levels due to increased labour market tightness. The labour demand curve is downward sloping, beginning at A/μ for formal workers and $\gamma A/\mu$ for informal workers, where A represents productivity, μ is the retail sector markup, and $\gamma<1$ reflects the productivity gap between the formal and informal sectors. While both sectors exhibit similar shapes for their demand and wage curves, the informal sector's flatter curves reflect its greater flexibility.

The model simulates an increase in formal sector hiring costs (B^F), which shifts the wage curve upward and the demand curve downward, reducing formal employment (N^F). This leads to lower tightness in the informal sector, shifting its demand curve upward and the wage-setting curve downward, thereby increasing informal sector employment (N^I).

Graph 10: Labour market steady-state equilibrium. Effects of an increase in formal sector hiring costs (B^F)



Graph 11: Impulse responses to an AD shock



To explore monetary policy implications, the model evaluates impulse responses to an AD shock. The inflation response is 42% higher in an economy with only formal labour compared with one that includes both formal and informal sectors. Output increases more in the latter case, as informal employment alleviates wage pressures in formal labour markets, enabling firms to expand production.

The underlying mechanism is grounded in workers' decision-making. When offered a formal job, workers weigh the option of accepting it against waiting for higher wages. The existence of informal labour markets reduces the probability of alternative offers, making workers more likely to accept lower wages. As a result, AD shocks generate a more muted inflationary response while supporting output expansion. Informal labour thus works as a buffer against shocks, weakening the correlation between output and inflation in response to shocks, and reducing the effectiveness of interest channel of monetary policy.

5. Monetary and non-monetary policies impacting heterogeneity

The BCRP's objective is to maintain monetary stability, with a focus on ensuring low and stable inflation. In doing so, it recognises that low inflation benefits households at the lower end of the income and wealth distributions more significantly. Historically, inflation has been likened to a tax on the poor, disproportionately eroding their incomes and savings.

Notably, the BCRP's mandate prohibits directing credit to specific industries or financing the Treasury. This restriction reflects lessons from Peru's economic history. Between 1962 and 1992, the BCRP operated under multiple objectives—including economic development and growth—which contributed to high and volatile inflation (Montoro et al., 2021).

One of the BCRP's key functions is maintaining and improving the payments system. Recent initiatives include facilitating the interconnection of privately issued electronic wallets, which has significantly expanded financial inclusion by providing financial services to individuals without access to bank accounts. This interconnection has expanded the functionality and reach of these wallets, improving their effectiveness in providing financial services. Additionally, the BCRP has launched a pilot for its own central bank digital currency.

Macroprudential policies aimed at ensuring financial stability also address aspects of economic heterogeneity. Peru's macroprudential framework - jointly overseen by the BCRP and the Superintendency of Banking, Insurance, and Pension Funds (*Superintendencia de Banca, Seguros y AFP*, SBS) - has evolved over decades, drawing lessons from episodes like the Asian and Russian crises, which underscored the need for tools to mitigate risks linked to financial dollarisation (Rossini and Quispe (2017)). The BCRP employs reserve requirements as a complementary instrument for macroprudential purposes.

Over the past decade, the BCRP implemented a de-dollarisation programme targeting dollar loans. This policy directly addresses heterogeneity in dollar funding, which exposes firms and households to varying degrees of exchange rate risk. The programme has been particularly successful in reducing credit dollarisation, especially for smaller firms and households (Table 1). Between December 2013 and December 2024, the dollarisation of credit from depository institutions to the private sector fell from 40.4% to 22.8%, with an even more striking decline in credit to individuals - from 22% to just 6.5%. Similarly, the dollarisation of credit to small and micro-enterprises dropped significantly, from 18.9% in 2011 to 5.6% in 2024.

Reactiva Perú stands out as the most significant economic programme of the last decade to avoid a credit crunch, with varying effects across sectors and population groups. Montoro (2020) provides an overview of the programme's design and presents statistics on the credit allocated. Implemented as part of the BCRP's unconventional monetary policy during the Covid-19 pandemic, its primary goal was to stabilise the credit market to prevent economic collapse. The programme involved three key actors: the BCRP, the Treasury and private banks. Under strict eligibility criteria, banks issued low-interest loans to firms; the Treasury guaranteed them against default; and the BCRP supplied the liquidity needed for their issuance.

Although the programme was not specifically designed to target smaller firms - those most vulnerable to lockdowns and mobility restrictions - it was extensively utilised by them. While accounting for only 30% of total sales, medium, small and micro enterprises received 44% of the credit allocated under the programme. *Reactiva Perú* is widely considered successful, as it helped avert an economic depression and limited the business failure rate by supporting firms that otherwise might not have survived the economic challenges of the pandemic.

Finally, the BCRP places significant emphasis on communication and outreach, tailoring its efforts to diverse stakeholders, including journalists, business representatives, students, and the general public. These efforts encompass educational initiatives on currency handling, financial literacy, and specialised training in economics and finance. While primarily focused on enhancing public understanding, these activities also indirectly address educational disparities closely linked to income inequality.

6. Conclusions

This report summarises the various sources of information used by the BCRP to incorporate heterogeneity into monetary policy analysis. Household and firm heterogeneity are closely monitored as part of the BCRP's background analysis, with particular attention to credit and dollarisation, reflecting their relevance in shaping economic dynamics. Another key dimension is relative prices, which are closely tracked to assess the appropriate monetary policy response.

Understanding perceived inflation is crucial for capturing the varied impacts of price changes across population groups, particularly the disproportionate impact of food price shocks on poorer households and rural communities. Recognising differences in perceived inflation can enhance inflation forecasting, improve policy analysis, and provide more precise diagnoses of economic challenges, particularly for vulnerable populations.

To evaluate the aggregate effects of heterogeneity, this report explores a model that explicitly incorporates labour informality. The model shows that the average proportion of informal workers significantly affects the loanable funds market. This impact is reflected on both the supply side (through precautionary savings by formal workers) and the demand side (through increased funding needs by informal workers), influencing the real interest rate. The model highlights a U-shaped relationship between the size of the informal sector and the real interest rate, reflecting the interplay of these forces.

The BCRP's focus on monetary stability is not incompatible with taking distributional concerns into account. Inflation places a greater burden on poorer households, and therefore the BCRP plays a crucial role in mitigating inequality by maintaining price stability. While not explicitly designed for this purpose, several BCRP instruments have significant indirect distributional implications.

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